

# **Wildlife Diversity Inventory of Bark Camp Barrens Wildlife Management Area**



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The Cumberland Plateau can be viewed from several locations on Bark Camp Barrens Wildlife Management Area, and is best observed from the native warm season grasslands.

Bark Camp Barrens Wildlife Management Area (WMA) (BCBWMA) is located east of Manchester in Coffee County, Tennessee. The 2,700-acre management area is located on the Eastern Highland Rim (English 2006). The Southern Cumberland Plateau can be seen from various locations on BCBWMA. Three compartments make-up BCBWMA and are separated by privately owned land (Figure 1).



**Figure 1:** Location of Bark Camp Barrens WMA.

A large portion of Bark Camp Barrens WMA lies within the historic Barrens Ecosystem. The dominant habitat across the WMA is Southern Interior Low Plateau Dry Oak Forest. Other habitats of the WMA include cropland, grasslands, and South-Central Interior Large Floodplains. The historic land use of Bark Camp Barrens was primarily for agricultural purposes. Portions of the WMA were cleared and converted to cropland (mitigation bank), but were reforested with bottomland hardwood forest species in efforts to restore this habitat type across the state. Pastures remaining on the WMA in 2004 were converted to native warm season grasses.



**Figure 2:** Areas within the mitigation bank were reforested with bottomland hardwood tree species.

In 1997, approximately 1,100 acres, of what is now part of BCBWMA, was entered into the Coffee County Wetland Mitigation Bank. In the early 1980's, the majority of land entered into the bank was tiled, ditched, drained, and deforested in order to make it profitable for agricultural production (Pyne 2000). According to the stipulations of the Wetland Mitigation Bank held by the National Ecological Foundation, the land was to be converted back to natural forested, emergent and open wetlands. Areas that were already forested were not re-vegetated. Roughly

900 acres were converted back to forested wetlands with the planting of native species (Figure 2), such as Willow Oak (*Quercus phellos*), Water Oak (*Quercus nigra*), Pin Oak (*Quercus*

*palustris*), Swamp White Oak (*Quercus bicolor* Willd.), and Green Ash (*Fraxinus pennsylvanica*). Almost half a million trees were planted. Natural colonization of wetland species, such as hazel alder (*Alnus serrulata*), American Hornbeam (*Carpinus caroliniana* Walter), Gray Dogwood (*Cornus foemina* Mill.), and Winterberry (*Ilex verticillata*), was expected (Coffee County Wetland Mitigation Bank Memorandum of Agreement). After five years of monitoring was completed, TWRA began overseeing the land.

Because the majority of the WMA is densely forested, grassland management is restricted to the converted pastures and forty acres of the mitigation bank. Less than 10% of Bark Camp Barrens WMA is managed for warm season grasses. Although this small amount of grassland habitat supports a high diversity of grassland birds during both the breeding and migration seasons, significant declines in certain bird species, particularly the Henslow's Sparrow, have been observed since 2005. Bark Camp Barrens WMA has been described as one of the most important sites for priority grassland birds in the state.

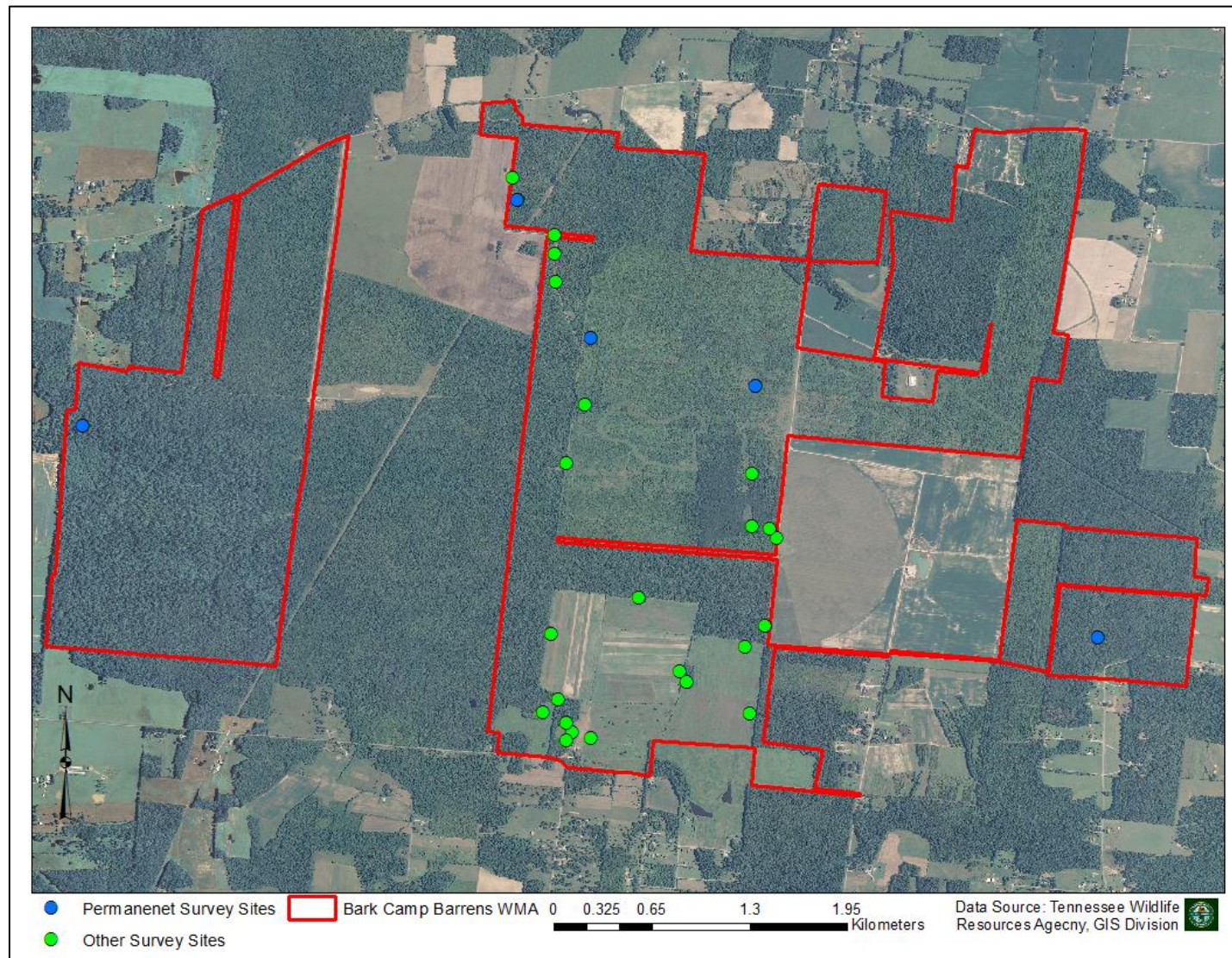
Restoration of Bark Camp Barrens will positively impact not only wildlife, but also the highly diverse flora that has brought much notoriety to the region. Seven species of rare plants have been found occurring on only a small portion of the management area. Six of these seven species are state listed as threatened or endangered. The seventh species, Maidencane (*Panicum hemitomon*), is a relic species only known from the Atlantic and Coastal Plains, and this particular location is one of only eight known locations in the State of Tennessee.

### **Wildlife Diversity Surveys**

In 2004, Region II Wildlife Diversity Biologists began wildlife diversity inventories of Bark Camp Barrens WMA. This work continued through 2007. Five permanent survey sites were constructed and placed in habitats that were representative of the wildlife management area (Figure 3). Each of these sites contained pitfalls with drift fences and wooden and metal coverboards. These structures remained in place throughout the duration of the inventory. Wildlife Diversity Biologists also conducted small mammal trapping at each of these sites with Sherman Live traps, as well as performing visual encounter surveys throughout the year.



**Figure 3:** Wildlife Diversity survey sites of Bark Camp Barrens WMA.



Other techniques were used to assess the presence or absence of nongame species on other areas of the wildlife management area. Point counts were conducted to assess the presence of birds and to track changes in the grassland bird communities during implementation of habitat management. Small pitfalls were placed at numerous sites to determine the diversity of shrew species inhabiting BCBWMA. Funnel traps were placed haphazardly in areas where snake movement was believed to occur. Small mammals were captured using Sherman live traps in areas known to harbor populations and mist nets were placed in areas where bat movements and foraging were anticipated. An anuran call survey route was established on BCBWMA and data were collected for two years.

Over 640 captures were made during the inventory of BCBWMA, the majority of which were small mammals (Table 1). Ninety-one species were documented on BCBWMA during the inventory. Species of Greatest Conservation Need (GCN) captured include: Four-toed

Salamander (*Hemidactylium scutatum*), Eastern Box Turtle (*Terrapene carolina*), Golden Mouse (*Ochrotomys nuttalli*), Masked Shrew (*Sorex cinereus*), Southeastern Shrew (*Sorex longirostris*), and Meadow Jumping Mouse (*Zapus hudsonius*). Four of the anurans documented were not captured but heard during anuran call surveys and include:

Cope's Gray Treefrog (*Hyla chrysoscelis*),

American Toad (*Anaxyrus americanus*), Eastern

Cricket Frog (*Acris crepitans*), and Pickerel Frog (*Lithobates palustris*). Bird species designated as species of greatest conservation need observed during inventory efforts include: Short-eared Owl (*Asio flammeus*), Savannah Sparrow (*Passerculus sandwichensis*), Henslow's Sparrow (*Ammodramus henslowii*), Grasshopper Sparrow (*Ammodramus savannarum*), Northern Harrier (*Circus cyaneus*), Prairie Warbler (*Dendroica discolor*), Dickcissel (*Spiza americana*), and Barn Owl (*Tyto alba*).

Although the total number of species of Greatest Conservation Need is similar to other WMAs in the county (excluding birds), there are likely several other species that went undetected during the inventory of Bark Camp Barrens WMA. The lack of detection



**Figure 4:** A species of shrew captured on BCBWMA.

**Table 1.** A list of species captured during the Wildlife Diversity surveys of Bark Camp Barrens WMA.

Common Name	Scientific Name	No.
<b>Frogs and Toads</b>		
Eastern Cricket Frog	<i>Acris crepitans</i>	12
Fowler's Toad	<i>Anaxyrus fowleri</i>	6
Eastern Narrow-mouthed Toad	<i>Gastrophryne carolinensis</i>	33
American Bullfrog	<i>Lithobates catesbeianus</i>	2
Green Frog	<i>Lithobates clamitans</i>	12
Southern Leopard Frog	<i>Lithobates sphenoccephalus</i>	6
Upland Chorus Frog	<i>Pseudacris feriarum</i>	3
Eastern Spadefoot	<i>Scaphiopus holbrookii</i>	3
<b>Salamanders</b>		
Spotted Salamander	<i>Ambystoma maculatum</i>	2
Marbled Salamander	<i>Ambystoma opacum</i>	50
Mole Salamander	<i>Ambystoma talpoideum</i>	9
Southern Two-lined Salamander	<i>Eurycea cirrigera</i>	3
Long-tailed Salamander	<i>Eurycea longicauda</i>	1
Four-toed Salamander	<i>Hemidactylium scutatum</i>	3
<b>Skinks and Lizards</b>		
Common Five-lined Skink	<i>Plestiodon fasciatus</i>	7
Broad-headed Skink	<i>Plestiodon laticeps</i>	1
Northern Fence Lizard	<i>Sceloporus undulatus</i>	5
Ground Skink	<i>Scincella lateralis</i>	1
<b>Turtles</b>		
Eastern Snapping Turtle	<i>Chelydra serpentina</i>	6
Common Musk Turtle	<i>Sternotherus odoratus</i>	5
Eastern Box Turtle	<i>Terrapene carolina</i>	5
Pond Slider	<i>Trachemys scripta</i>	5



Snakes		
Eastern Wormsnake	<i>Carphophis amoenus</i>	4
Eastern Racer	<i>Coluber constrictor</i>	20
Yellow-bellied Kingsnake	<i>Lampropeltis calligaster</i>	1
Black Kingsnake	<i>Lampropeltis nigra</i>	8
Milksnake	<i>Lampropeltis triangulum</i>	1
Northern Watersnake	<i>Nerodia sipedon</i>	2
Northern Rough Greensnake	<i>Opheodrys aestivus</i>	1
Ratsnake	<i>Pantherophis alleghaniensis</i>	7
Cornsnake	<i>Pantherophis obsoletus</i>	2
Dekay's Brownsnake	<i>Storeria dekayi</i>	1
Red-bellied Snake	<i>Storeria occipitomaculata</i>	1
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	1
Non-volant Mammals		
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>	20
Least Shrew	<i>Cryptotis parva</i>	1
Virginia Opossum	<i>Didelphis virginiana</i>	1
Prairie Vole	<i>Microtus ochrogaster</i>	13
Woodland Vole	<i>Microtus pinetorum</i>	8
House Mouse	<i>Mus musculus</i>	4
Golden Mouse	<i>Onchrotomys nuttalli</i>	6
White-footed Mouse	<i>Peromyscus leucopus</i>	150
Eastern Harvest Mouse	<i>Reithrodontomys humulis</i>	28
Hispid Cotton Rat	<i>Sigmodon hispidus</i>	141
Masked Shrew	<i>Sorex cinereus</i>	2
Southeastern Shrew	<i>Sorex longirostris</i>	3
Eastern Cottontail	<i>Sylvilagus floridanus</i>	2
Eastern Chipmunk	<i>Tamias striatus</i>	1
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	2
Volant Mammals		
Eastern red bat	<i>Lasiurus borealis</i>	9
Northern long-eared bat	<i>Myotis septentrionalis</i>	2
Tri-colored bat	<i>Perimyotis subflavus</i>	6
	<b>Total</b>	<b>628</b>

Yellow denotes species of greatest conservation need.

of these species, such as the Northern Pine Snake (*Pituophis melanoleucus*) is likely due to these species' cryptic behavior. Several of the potential species that may be present on this WMA are fossorial and presence may only be detected during certain times of the year. Even though surveys occurred year round, these species were not detected.

## Future Management

Because BCBWMA is located within the Barrens ecosystem of the Eastern Highland Rim, numerous natural processes have allowed the creation of a variety of habitats and microhabitats that sustain high levels of diversity. The forested areas harbor high numbers of



**Figure 5:** A Henslow's Sparrow captured during surveys.

amphibians, primarily Ambystomatid salamanders, which breed in the numerous ephemeral wetlands occurring on the WMA. The grasslands and old field habitats support numerous species of snakes and boast an even higher diversity of grassland birds. Given the documented presence of priority grassland bird species, emphasis has been placed on grassland habitats and increasing the amounts of these habitats across the

WMA without impacting the species of greatest conservation need that occur within the forested areas.

In recent years, habitat management has focused on maintaining the current grassland habitats in conditions suitable for breeding grassland bird species. This has primarily been conducted through the application of prescribed fire. Rotational burning regime has been established to ensure differing seral stages remain annually that allow for adequate breeding by species such as Henslow's Sparrow. Monitoring of the grassland birds



**Figure 6:** Application of prescribed fire in the grasslands of BCBWMA.

has indicated a decline in breeding populations. This decline has been linked to the quality of habitat within portions of the mitigation lands. Management of these lands is not currently allowed under the Memorandum of Agreement created when the mitigation bank was established. Efforts are currently under way to secure permission that would allow management of larger portions of these lands. Lands managers, biologists and Wildlife Diversity Personnel are developing a management plan that will address management of the numerous habitats and diversity of Bark Camp Barrens WMA.

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